

ASPECTS OF TREATMENT*

Meckel's Diverticulum: to look or not to look: to resect or not to resect

A LANG-STEVENSON FRCS

Cardiff Royal Infirmary

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Summary

The opinions of surgeons on their management of an incidentally found Meckel's Diverticulum under various circumstances is obtained and analysed. The literature is reviewed.

It is concluded that no guidelines can be given to the junior surgeon that will be acceptable to all his seniors.

Further studies have to be undertaken to ascertain where the actual complication rate of a Meckel's Diverticulum lies in the 1% to 33% range quoted in current publications, before an objective decision can be taken on whether to resect or not, with a view to reducing morbidity and mortality.

Introduction

No one is in doubt what action should be taken when a complication of a Meckel's Diverticulum occurs. Considerable difference of opinion exists however, both in the literature (1-19) and during discourse with colleagues on the correct management of an incidentally found Meckel's Diverticulum.

Considerable morbidity may be associated with incidental diverticulectomy (2, 9, 14, 16) and similar morbidity and even mortality may occur if a Meckel's Diverticulum is not resected (1, 2, 4, 6-10, 13, 14, 16, 19), the statistics varying according to where one looks in the literature. It was felt worthwhile obtaining the opinion of a captive audience of surgeons at a recent national surgical conference by means of a questionnaire.

Methods

The questions asked are in Table I. The participants were asked to fill in the appropriate response to the questions and to assume: (i) that a junior surgeon had produced the situation but that an experienced surgeon would perform any resection necessary; (ii) all surgery was being performed for right iliac fossa symptoms and signs through a right iliac fossa incision and that no other pathology other than that stated was apparent; (iii) macroscopically normal was taken to mean no visible nor palpable abnormality.

Results

Thirty-four completed questionnaires were collected; 20 by consultants, 8 by senior registrars and research fellows, and 6 by registrars. This represented over 75% response from the consultants and 90% from senior registrars attending that morning. Applying χ^2 test to the answers of consultants, senior registrars, and registrars for each question, there was no significant difference. However, taking the responses as a

TABLE I Questionnaire

1	An acutely inflamed appendix is found and removed. Should you look for a Meckel's Diverticulum?	Yes	No
2	An inflamed appendix has been removed. A Meckel's Diverticulum, which is macroscopically normal with a wide neck, is also found. Should it be resected?	Yes	No
3	An inflamed appendix has been removed. A narrow Meckel's Diverticulum, which is macroscopically normal is also found. Should it be resected?	Yes	No
4	An inflamed appendix has been removed. A macroscopically abnormal Meckel's Diverticulum with ?? ectopic tissue palpable is also found. Should it be resected?	Yes	No
5	A perforated purulent appendix has been removed. A macroscopically abnormal Meckel's Diverticulum with ?? ectopic tissue palpable is also found. Should it be resected?	Yes	No
6	A macroscopically normal appendix is found and resected. A wide necked macroscopically normal Meckel's Diverticulum is also found. Should it be resected?	Yes	No
7	A macroscopically normal appendix is found and resected. A macroscopically normal narrow Meckel's Diverticulum is also found. Should it be resected?	Yes	No
8	A macroscopically normal appendix is found and removed. A macroscopically abnormal Meckel's Diverticulum with ?? palpable ectopic tissue is also found. Should it be resected?	Yes	No
9	Would age, of a 'fit for general anaesthetic patient', (assuming > 10 years) affect any of your decisions?	Yes	No
10	If so, would you be more inclined to resect in age group: 10-30 years	Yes	No
	30-60 years	Yes	No
	> 60 years	Yes	No
11	If a right paramedian incision had shown a perforated purulent appendicitis, but also a macroscopically abnormal Meckel's Diverticulum with ?? palpable ectopic tissue (noted while looking for the appendix) would you resect both?	Yes	No

whole, it was very clear that considerable disagreement existed in the majority of each of the situations posed (Table II). Only in questions 7 and 8 was the response unanimous to resect the Meckel's Diverticulum.

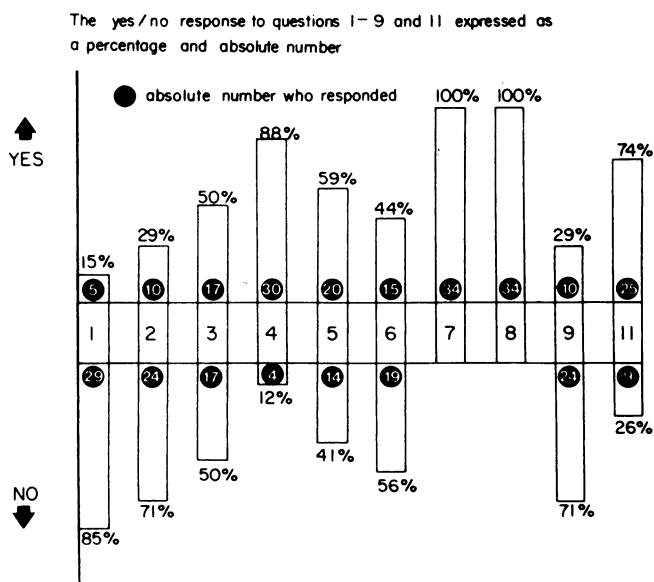
In question 1, an acutely inflamed appendix has been found and resected. One would think that on the grounds of having confirmed the clinical diagnosis, and on the basis that to look for Meckel's Diverticulum would risk spreading

Address for correspondence: 95 Stumperlowe Hall Road, Fulwood, Sheffield S10 3QT, South Yorkshire.

The Editor would welcome any comments on this paper by readers

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TABLE II



localised infection around the peritoneal cavity (3) that all would stop at appendectomy. However, three consultants, one senior registrar, and one registrar, 15%, were in favour of looking for a Meckel's Diverticulum. Such action is supported in the literature (10, 12).

In questions 2, 3, and 4 an inflamed appendix has been removed but a wide necked normal Meckel's Diverticulum, a narrow necked normal Meckel's Diverticulum, and one with the possibility of palpable ectopic tissue have been found respectively. In the first instance only 29% were in favour of resecting this wide necked Meckel's Diverticulum with no palpable abnormality. It has been suggested, however, that a wide necked Meckel's Diverticulum is just as likely to cause complications from foreign body impaction, or by becoming the apex of an intussusception (4, 10). Also it is not possible to predict which Meckel's Diverticula will lead to complications (6, 14). The ability to assess whether the lumen is wide or narrow is open to considerable subjective error (15). In the second instance 50% were in favour of resecting the narrow Meckel's Diverticulum; this increase, it must be inferred, being due to the narrowness making it more susceptible to complications. In the third instance where there is palpable ectopic tissue, 88% are in favour of resecting the Meckel's Diverticulum. It is recorded however that the ability of individuals to palpate ectopic tissue is unreliable being over diagnosed but with false negatives as well (9). The literature suggests that between 6% and 17% of Meckel's Diverticula will have heterotopic tissue (9-11, 14).

In question 5 a purulent appendix has been removed but an abnormal Meckel's Diverticulum with possible palpable ectopic tissue was found; 59% were in favour of resecting the Meckel's Diverticulum. Thus nearly 30% of those who were in favour of resecting a Meckel's Diverticulum, which was palpably abnormal in the presence of an inflamed appendix, chose not to when the appendix was purulent. Contamination of the peritoneal cavity has occurred and so the decision is of a small bowel resection in the presence of sepsis versus leaving an abnormal Meckel's Diverticulum in situ. Aubrey (10) reviewed 30 cases of acute appendicitis in which Meckel's Diverticula were resected without complications but Maingot (3) suggested that resection of a Meckel's Diverticulum in the presence of acute inflammation of another organ was contra-indicated. Others (2, 4, 6-10, 12-14, 16, 19) state that removal of an incidentally found Meckel's Diverticulum to eliminate the future possibility of complications does not significantly increase the risk of

operation and averts the possibility of high morbidity and mortality. Robins (12) describes 20 out of 100 operations for complicated Meckel's Diverticula which occurred where the Meckel's Diverticula had been noted in a previous operation and left, and this figure is confirmed by Root (13) in another series.

The alternatives in treating an incidentally found Meckel's Diverticulum along with a diseased appendix are: (i) to remove the Meckel's Diverticulum; (ii) leave it in situ believing it is unlikely to develop complications; (iii) go back electively to remove a known Meckel's Diverticulum—but is this subjecting the patient to a risk equal to, or greater than resecting the Meckel's Diverticulum when it is first encountered.

In question 11 the same situation of a purulent appendicitis and abnormal Meckel's Diverticulum is posed, but the approach has been through a right paramedian incision. Here 74% were in favour of resecting the Meckel's Diverticulum (an increase of 15% compared to question 5). Is the logic here of; (i) better exposure; (ii) that the contamination of the peritoneal cavity has been more complete and so cannot be worsened; (iii) that in future times it must be assumed that a Meckel's Diverticulum would have been seen and dealt with at the same time as the appendectomy: where as one might correctly assume a Meckel's Diverticulum had not even been looked for when an inflamed appendix had been removed through a right iliac fossa incision.

In question 6 a normal appendix has been removed and a macroscopically normal Meckel's Diverticulum found. Surprisingly only 44% were in favour of resecting the Meckel's Diverticulum. In the absence of other pathology one must assume that the symptoms have a high possibility of being related to either the appendix or the Meckel's Diverticulum even though they may appear normal to the naked eye and palpation; thus surely both should be resected.

In question 9, 71% said age would not affect their management of an incidentally found Meckel's Diverticulum. Of the 29% whose decision was modified by the age of the patient, half were more inclined to resect in the 10-30 year age group, and half in the 30-60 year age group. This is in part supported by the literature. Michas *et al.* (14) pointed out that the most patients who develop complications do so before 20 years of age. But he also states that a Meckel's Diverticulum should be resected at any age so long as the morbidity of the primary procedure is not increased. Hutchinson and Randall (15), however, did not confirm Michas' statement that more complications occur in the first two decades of life. Soltero and Bill (16) produced a graph of the risk of complications in Meckel's Diverticulum which indicated it is highest in the first decade with a 4% complication risk, falling off evenly thereafter until it is 2.5% at 20 years of age and approximately 1% at 60 years of age. However a complication of a Meckel's Diverticulum in old age has a poorer prognosis in terms of morbidity and mortality (6, 14).

Discussion

It appears from the results of this survey that there is much disagreement over the correct management of an incidentally found Meckel's Diverticulum. Conflicting views and statistics are also found in the literature. Johann Meckel stated in the early nineteenth century that the complication rate in the diverticulum he described was 25% (17). This figure is now considered by many to be too high (16, 18), although in 1975 Michas (14) published a figure of 15-33%. Hutchinson and Randall (15) in a small series published a figure of 29%. Moses (18), and Soltero and Bill (16) considered 4% a more realistic figure (the latter having the largest series). With the generally accepted occurrence of Meckel's Diverticulum in the population of 2% (1-7, 11, 14, 16, 18), a 25% complication rate would mean one in 200 of the general population would have a complication in their

Meckel's Diverticulum. The morbidity and mortality associated with complicated Meckel's Diverticula would thus make it worthwhile resecting an incidentally found Meckel's Diverticulum. However, if one accepts the figure of a 4% complication rate in Meckel's Diverticula (16, 18) the balance between morbidity and mortality in a Meckel's Diverticulum left in situ, and that associated with its removal, becomes finer. Soltero and Bill calculated that the complication rate in a 35 year old was approximately 2%, and therefore theoretically 800 normal incidentally found Meckel's Diverticula would have to be removed from individuals over 35 years of age to prevent one death and would incur up to 80 incidents of postoperative morbidity. On this basis they recommend that incidental diverticulectomy is seldom justified. They acknowledge, however, that there is zero mortality associated with Meckel's diverticulectomy (3, 6, 9-13, 16, 19). With age the incidence of complications in Meckel's Diverticula falls off (3, 7, 10, 11, 14-16), but the morbidity and mortality in old age increases (6, 14).

Conclusion

The majority of opinion in this survey recommends that when operating for a suspected pathology in the right iliac fossa, through an incision in the right iliac fossa:

- (1) If an inflamed appendix is found, remove it and make no further exploration (85% to 15%).
- (2) In the presence of an inflamed appendix, a Meckel's Diverticulum which appears to be normal with a wide base *should* be left (71% to 29%), and a narrow one *may* be left (50% to 50%), but one with the possibility of ectopic tissue should be removed (88% to 12%).
- (3) Even in the presence of a burst purulent appendix, a Meckel's Diverticulum with the possibility of ectopic tissue should be removed (59% to 41%).
- (4) A narrow Meckel's Diverticulum or one with possible ectopic tissue should be removed at the same time as a normal appendix (100%), but perhaps surprisingly, a wide necked normal Meckel's Diverticulum should be left after having removed a normal appendix (44% to 56%).

Until we know which end of the range of 4-33% the complication rate in Meckel's Diverticula lies an objective decision on whether or not to resect an incidentally found Meckel's Diverticulum, based on the expected morbidity and mortality, cannot be made. Until then there will continue

to be considerable variance of opinion on the correct line of management of an incidentally found Meckel's Diverticulum.

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